Recent Trends in Prostate Cancer Incidence and Mortality

Increases in U.S. prostate cancer incidence and mortality rates since the 1970s have been followed more recently by declines. Scientists at the National Cancer Institute (NCI) are working to understand these trends, including conducting investigations into the effect of changing patterns in prostate cancer screening on these rates.

Prostate Cancer Incidence

Incidences rates rose sharply after 1989, but then began falling sharply after 1992.

- Age adjusted rates* of prostate cancer incidence rose 69 percent in U.S. men from 1989 to 1992, compared with 20 percent from 1985 to 1988 and 3 percent from 1981 to 1984.

- For white men, the incidence rate peaked in 1992 at 185.8 new cases per 100,000 men before dropping 27 percent to 135.3 new cases per 100,000 in 1994. Incidence in African American men peaked in 1993 at 264.7 cases per 100,000 before declining 11 percent to 234.4 cases per 100,000 in 1994.

There is broad agreement that increased use of the prostate-specific antigen (PSA) screening test after 1989 created an artificial rise in incidence rates.

* Rates are age-adjusted to take into account the aging of the U.S. population. All rates cited in this statement are age-adjusted to the 1970 U.S. standard population.

- In 1995 NCI researchers published a study that linked the sharp rise in new cases from 1986 to 1991 to increased use of the PSA blood test (Potosky et al, 1995). Physicians increased their use of the PSA test for men age 65 and older—the age group most susceptible to prostate cancer—from 1,430 tests per 100,000 men in 1988 to 18,000 per 100,000 men in 1991.

Researchers at NCI are studying the fall in incidence, which may also be a result of changing PSA screening patterns. A first round of screening picks up long latent, as well as more recent, cancers and creates a "spike" in incidence rates. But if the rate of first-time screening drops, the incidence rate can also be expected to drop because first-time screening yields more cancers than subsequent screening. The researchers are looking at the use of PSA screening among Medicare patients, and hope that by separating out the early screens from later ones, they will better understand the relationship between PSA testing and prostate cancer incidence.

Prostate Cancer Mortality

The recent decline in prostate cancer mortality rates occurs in the context of a long-term increase.

- Since 1977 there has been a gradual increase in prostate cancer mortality rates. This rate of increase sped up slightly in the mid-1980s before mortality rates began to drop slightly in 1992.

- The prostate cancer death rate for white men began dropping in 1992 and for black men in 1994. The rate declined 6.3 percent overall from 1991 to 1995.

NCI researchers caution against attributing the recent decrease in reported prostate cancer death rates to the increase in prostate cancer screening. Two epidemiological concepts are important in understanding why:

- **Lead time.** The time between when a cancer is detected through a screening test and when it would be clinically detectable. Researchers estimate that on average, PSA screening detects prostate cancer 5 or more years earlier than it

would have been detected otherwise (through the appearance of symptoms or by digital rectal exam). Any mortality associated with a PSA-detected cancer—and that could potentially be prevented by early treatment—would take place only after this 5-year "lead time" has passed. But the drop in mortality rate occurred extremely quickly compared with the estimated average lead time.

Researchers would not usually expect to see any significant drop in mortality before the initial 5-year average lead time has passed. The fact that the decline in prostate cancer mortality occurred so soon after the popularization of the PSA test casts serious doubt on the plausibility of a direct cause-and-effect link.

- **Attribution bias.** A distortion of true mortality rates that occurs when the stated cause of death is incorrect. A recently diagnosed cancer may be recorded as cause of death, even if, as in the case of preclinical prostate cancers, it is almost certainly not the true cause of death. The death of an elderly man might thus be wrongly attributed to prostate cancer simply because a recent diagnosis is in his files and no other underlying cause could be identified.

  Rapid adoption of PSA testing led to a sharp increase in new diagnoses of preclinical prostate cancer after 1989. As the initial "spike" in incidence began to fall off in 1992, there were fewer men with recent diagnoses of prostate cancer, and consequently fewer deaths might have been incorrectly attributed to prostate cancer.

Using computer modeling techniques and other methods, NCI researchers are investigating the relationship between the decline in prostate cancer mortality rates and the rapidly changing patterns in PSA screening.

Investigating the Benefits and Risks of Screening

Screening is considered useful when there is evidence that treatment at an earlier stage of disease will result in fewer overall deaths or reduce the need for aggressive treatment. In prostate cancer, uncertainty about the natural progression of the disease and the effectiveness of specific treatments makes it unclear whether early treatment will result in lower mortality.

It is often very difficult to distinguish between prostate cancers that may become life-threatening and those that may not. Prostate cancer is often slow-growing, and autopsy

studies reveal that a large percentage of older men who died of other causes also had undiagnosed prostate cancer. But increased screening is certain to lead to more treatment, and thus more treatment-related problems, including impotence and incontinence.

NCI is currently

- supporting studies to compare surgery with watchful waiting in the management of prostate cancer and to assess the quality of life of patients undergoing treatments.

- conducting a large-scale, randomized study to determine whether the PSA test and digital rectal exam will reduce deaths due to the disease. The Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial will follow the progress of 74,000 men (and 74,000 women). Half of the study participants are being regularly screened for the cancers under study, and half receive usual medical care.

Prostate cancer is the most frequently diagnosed non-skin cancer in U.S. men, but is a distant second to lung cancer as a cause of death. In 1997 the estimated number of new cases of prostate cancer is 209,000, and the estimated number of deaths from this disease is 41,800. For comparison, lung cancer will strike 98,300 men and kill 94,400 men in 1997.

Reference:

Potosky AL, Miller BA, Albertson PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. *Journal of the American Medical Association* 1995; 273(7): 548–552.

# # #

Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1–800–4–CANCER (1–800–422–6237)
TTY (for deaf and hard of hearing callers): 1–800–332–8615

NCI Online

Internet

Use http://www.cancer.gov to reach NCI's Web site.

CancerMail Service
To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service
Dial 301–402–5874 and listen to recorded instructions.

This fact sheet was reviewed on 12/5/97